MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

TPA 7021 – DATA PREPROCESSING AND ANALYSIS

(All sections / Groups)

5 OCTOBER 2017
10.00 a.m – 12.00 p.m
(2 Hours)

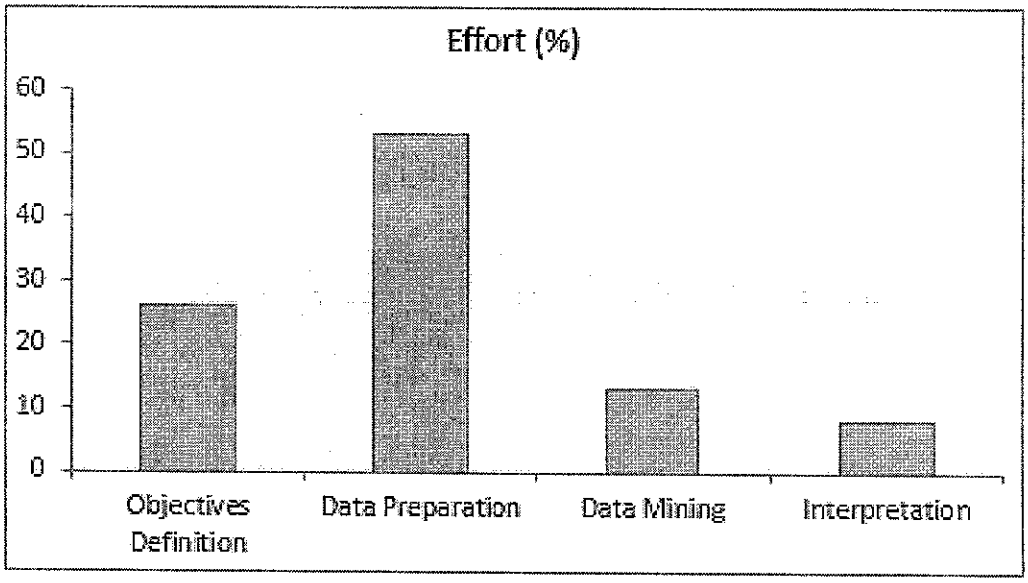
INSTRUCTIONS TO STUDENTS

1. This question paper consists of **6** pages with FOUR questions only.
2. Answer **ALL** questions.
3. Please write all your answers in the Answer Booklet provided.

QUESTION 1

(a) Study the following chart and discuss the reasons for the large effort in "Data Preparation" phase.

[2 marks]



(b) Real-world data is often "dirty". State the characteristics of "dirty" data.

[3 marks]

(c) Define *outlier* in the context of data preprocessing. Discuss whether all outlier should be treated as dirty data. Give an example to support your argument.

[5 marks]

Continued...

QUESTION 2

(a) What chart should one use to illustrate the retail store visit patterns in a shopping mall? Assuming that the visit patterns are always *linear*.

[1 mark]

(b) Differentiate *Nominal* and *Ordinal* types of attributes.

[4 marks]

(c) The `ifelse()` function in `R` programming can act as a "flag" to data that has violated the constraints. Study the data frame `dt.Results` below carefully and write an R script to set Marks > 80 to "A", otherwise "B". Create a new variable named `chkResults` to store the results.

`dt.Results`

Student_Name	Marks
Ting	75
Chong	86
Fatimah	90

[2 marks]

(d) Which type of chart is best for visualizing the relationship between two *numerical* variables. Discuss your reason for using that chart.

[3 marks]

Continued...

QUESTION 3

(a) The scenario below is an experiment gathered to investigate the performance of three different brands of laptop. Study the following R codes carefully.

```
>Laptop1 <- c(2,3,7,2,6)
>Laptop2 <- c(10,8,7,5,10)
>Laptop3 <- c(10,13,14,13,15)
>Combined_Groups <- data.frame(cbind(Laptop1,
                    Laptop2,Laptop3))
>Stacked_Groups <- stack(Combined_Groups)
>Anova_Results <- aov(values ~ ind, data = Stacked_Groups)
>TukeyHSD(Anova_Results)

  Tukey multiple comparisons of means
    95% family-wise confidence level

Fit: aov(formula = values ~ ind, data = Stacked_Groups)

$ind
                diff       lwr       upr     p adj
Laptop2-Laptop1    4 0.4206853  7.579315 0.0286585
Laptop3-Laptop1    9 5.4206853 12.579315 0.0000598
Laptop3-Laptop2    5 1.4206853  8.579315 0.0075279
```

As data scientist, what can you conclude?

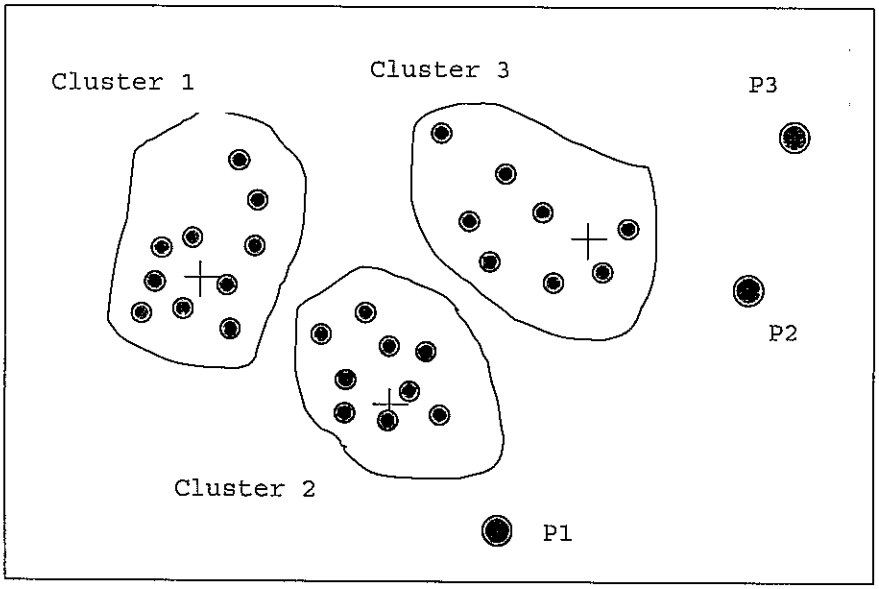
[2 marks]

(b) What is *Noisy* data? List FOUR techniques to handle noisy data.

[3 marks]

Continued...

(c) What is the best way to handle P1, P2, and P3 if you cannot omit them?



[2 marks]

(d) What are the THREE different techniques for dimension reduction?

[3 marks]

Continued...

QUESTION 4

(a) Interquartile range of an observation variable is the difference betwen its upper and lower quartiles. What information can you observe from interquartile range?

[2 marks]

(b) Study the following result:

```
> TukeyHSD(Anova_Results)
  Tukey multiple comparisons of means
    95% family-wise confidence level

Fit: aov(formula = values ~ ind, data = Stacked_Groups)

$ind
               diff       lwr       upr     p adj
Group2-Group1     4 0.4206853  7.579315 0.0286585
Group3-Group1     9 5.4206853 12.579315 0.0000598
Group3-Group2     5 1.4206853  8.579315 0.0075279
```

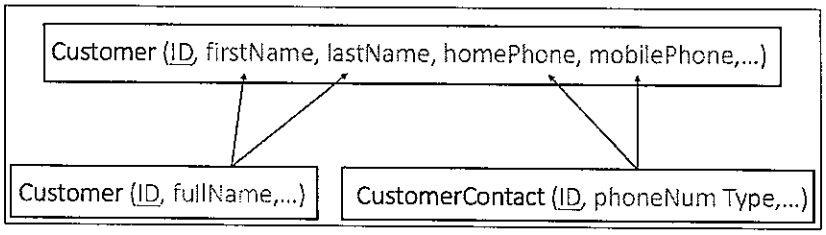
(i) What is the command `TukeyHSD(Anova_Results)` for?

[2 marks]

(ii) What is the conclusion based on the above result?

[2 marks]

(c) Data integration is a challenging task. Below is an example of data integration challenge related to "Schema Integration".



Referring to figure above, how could the challenge be solved?

[2marks]

(d) Study the R code below:

```
> Model <- lm(z ~ a + b + c + d, dataset)
> step(Model)
```

Explain how the codes above help in dimension reduction.

[2 marks]

End of Pages.